

up of two sub-plates made of shape memory material, a material A and a material C, identical or different to one another, for example in the form of two sub-plates welded or bonded to one another to form one single plate. Parts of the sub-plate made of material A have a first form in the cold state and a second form in the hot state. Corresponding parts of the sub-plate made of material C have a first form in the cold state and a second form when hot. The second form in the hot state of the corresponding part made of material C is such that in this form the sub-plate resumes its first form. This works as follows:

[0016] A part of the sub-plate made of material A for example, is deformed by heating and resumes its memorised form. The deformation of the part made of material A causes mechanical deformation of the corresponding part of the sub-plate made of material C. If at this stage the alloy C is heated, the alloy C resumes its memorised form such that the ensemble of the two alloys resumes the initial form.

[0017] In this third embodiment the two layers of material A and C are preferably attached to one another by means of a thermal insulating layer. The layers of material A and C can thus be heated independently. This third embodiment allows, as does the second form, control of the rest time of a pattern made on the plate.

[0018] In an embodiment the control means of the transformation means of the modification elements of the tactile sensation comprise one or more laser emitters whereof the radiation from each is utilised to effect transformation of one or more transformation means of modification elements of the tactile sensation.

[0019] The control means further comprise, as in the prior art, a control circuit for selecting, as a function of tactile data to be displayed at any given instant, the modification elements of the tactile sensation on which it is necessary to act to obtain display of the tactile data, and direct the radiation from the laser emitter to these selected elements. In the prior art these control means comprise an address circuit, and a control circuit of the address circuit which directly controls the address circuit addressing the elements which must be acted on.

[0020] This same configuration of the control means can be found in the invention for cases where there are as many laser emitters as transformation elements, each transformation element being in bijective correspondence with a laser emitter.

[0021] In general, there are one or more laser emitters, at least one of the laser emitters acting on several transformation elements. When there is a single laser emitter for all the transformation elements, the control means acting on shift means of the radiation output by this laser emitter to successively apply the radiation to the transformation elements which must be acted on, considering the tactile data to be displayed. When there are several laser emitters whereof some act on several transformation elements, the control circuit is in two stages, a first selection stage of the lasers whereof the radiation will be used to create the display, for example in the form of an address circuit controlling the emission of radiation of the laser emitters, these laser emitters being in correspondence, by way of distribution means of the radiation, with transformation means necessary for the formation of the projected display

of the tactile data, and a second stage acting on shift means for shifting the radiation emitted by each laser whereof the radiation is utilised for the projected display, for successively applying the radiation to the transformation elements in correspondence with this laser emitter, which is to be acted on considering the tactile data to be displayed.

[0022] This aspect of the control means, relative to selection of the radiation useful for a given display and of the control of shifts of the radiation, is within the knowledge of the specialist and will not be taken up further in the present description.

[0023] There can be as many lasers as modification elements of the tactile sensation provided. Each of the radiations in this case heats or does not heat a modification element of the tactile sensation. In this way the radiation from a laser is placed in bijective correspondence with a modification element of the tactile sensation.

[0024] In the preferred embodiment of the invention, the control means of the elements of the tactile sensation comprise a laser emitter controlling a plurality of modification elements of the tactile sensation and means for mobilising the radiation with one or two degrees of freedom.

[0025] In this case, the tactile sensation will be renewed at a frequency which is a function of the power of the laser, the number of the means of transformation with which a laser is associated, the application time necessary for passing from the rest position to the work position, and the rate of shift made possible by the means for moving the radiation with one or two degrees of freedom.

[0026] In the case where the radiation is rendered mobile with a degree of freedom and where the modification elements of the tactile sensation are constituted by a matrix unit in lines and columns, the radiation from a laser common for example to the transformation means of the modification elements of the tactile sensation of a line can be directed successively for example towards each of the modification elements of the tactile sensation of the line to be modified. This control could be effected by first translation means of the laser assigned to this line, or by a reflector controlled in rotation, receiving the radiation from the laser, the rotation of said reflector controlling the rotation of the radiation received to send it to the transformation means of the line which require transformation.

[0027] In the case where the radiation is rendered mobile with two degrees of freedom, these two degrees in a first embodiment are constituted by translation means of the laser and a reflector controlled in rotation at the same time. Preferably, in this case the axis of rotation of the reflector is parallel to the translation vector. In this case the translation or rotation means control translation of the translation or the rotation means of the reflector respectively, to send the radiation to a part at least of the modification elements of the display device.

[0028] In a second variant of the embodiment comprising one or more lasers with displacement of the radiation according to two degrees of freedom, the second degree of freedom is obtained by the fact that second translation means are added to first translation means, or by the fact that the reflector is rendered mobile in rotation according to two non parallel axes.